INS. KOREANA, 20(2): 187~193. June 30, 2003

Review of Genus *Myrmecina* (Hymenoptera: Formicidae: Myrmicinae) of Korea

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Abstract The genus *Myrmecina* of Korean fauna is reviewed. Two species of the *Myrmecina* have been recorded from Korea, *Myrmecina nipponica* Wheeler and *Myrmecina flava* Terayama. They are fully described here with its morphological characteristics and SEM photomicrographs. Detailed characteristics of the genus, a key to the Korean species, and worker images of each species are provided.

Key words Systematics, *Myrmecina nipponica*, *Myrmecina flava*

INTRODUCTION

The genus *Myrmecina* contains 35 known species found in the entire world. The ants in *Myrmecina* are uncommon in fields. Most of them have been colleted from leaf litter samples. A few colonies, which have been found so far, were small and occurred either in the soil under rocks, or in rotten wood.

It was characterized by the sides of the head behind the eyes with an elongate ridge or groove on each side which starts at the mandibles, runs the length of the head and ends near the upper corners. In lateral view, the petiole is low, rounded, and barrel-shaped and lacks a distinct node. The propodeum is armed with long spines near the angle as well as short spines or angles near the metanotal groove. The distinctive ridge on the sides of the head behind the eyes combined with the low and rounded petiole is likely to separate *Myrmecina* from others.

In Korea, *Myrmecina graminicola nipponica* Wheeler is the first recorded species in the genus *Myrmecina* (Teranishi, 1940). However, the status of these forms should be re-examined as *M. graminicola nipponica* is found to be different from *M. graminicola graminicola* at least in the shape of the anterior margin of its clypeus, the form of the propodeal spines, and the sculpturation of the mesosomal dorsum (Terayama & Kubota, 1989). Since then, *M. graminicola nipponica* has been definitively considered as a separate species, *M. nipponica*, different from *M. graminicola*. Several species of *Myrmecina* have been reported in Korea but all turn out to be synonyms of *Myrmecina nipponica* Wheeler. The first author examined the Korean specimens by comparing with Russian at the Far Eastern Branch of the Institute of Biology and Soil Sciences Russian Academy of Science, Vladivostok, and found that all the Russian specimens are *M. graminicola graminicola*. Thus, Russian species is *M. graminicola*, and the Korean species is *M. nipponica*, same as Japanese. On the other hand, *M. sinensis* is found neither in Korea, nor in Russia.

Myrmecina flava Terayama, found in Mt. Heugseong-san and Mt. Hanlasan by Choi and Park (1999) for the first time, was reported without any description. As the specific or

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subspecific status in *Myrmecina* could be a very delicate matter within the genus, we fully described the species here, as well as the genus *Myrmecina* and the rest species.

Abbreviations used in this paper are as follows: GG, Gyeonggi-do; GW, Gangwon-do; CB, Chungcheongbuk-do; CN, Chungcheongnam-do; JB, Jeonlabuk-do; JN, Jeonlanam-do; GB, Gyeongsangbuk-do; GN, Gyeongsangnam-do; JJ, Jeju-do. Romanization of Korean geographic names follows the rule set by the National Academy of the Korean Language in 2000.

MATERIALS AND METHODS

The specimens examined in this study have been collected by the first author for the last six years, and loaned from Dr. Choi's private collection. In general, it is difficult to find dacetine ants by usual field search. However, abundant samples are sometimes found after shifting litter and surface soil and applying extraction methods using Winkler bags or Berlese funnels. The specimens collected were saved as either dry-mounted or alcohol-preserved.

To observe morphological characters, specimens were dehydrated through ethanol series and fixed by 100% amyl acetate. They were then dried with a critical point drier (Hitachi Hcp-2, Japan), gold-coated, and observed using a scanning electron microscope (Hitachi S-2460N).

SYSTEMATICS

Genus *Myrmecina* Curtis, 1829

Myrmecina Curtis, 1829, Brit. Entomol. 6: 265. Type species: *Myrmecina latreillii* Curtis, 1892: 265.
Archaeomyrmex Mann, 1921, Bull. Mus. Comp. Zool. 64: 448. Type species: *Archaeomyrmex cacabau* Mann, 1921: 448.

Worker. Head subrectangular, longer than broad, with rounded posterior corners; occipital carina low, extending to ventral surface forming parallel longitudinal rugae. Mandible stout, subtriangular with robust basal arm; basal margin apart from anterior margin of clypeus when closed; masticatory margin with distinct 2 apical teeth followed by small and indistinct 7 or 8 denticles; masticatory axis forming almost right angle with long axis of head. Labrum with small but distinct dorsal projections. Palp formula 4:3. Median portion of clypeus raised; anterior margin projecting forward. Frontal carinae short, with broad frontal lobes which cover antennal insertions. Antennae 12-segmented; scape short, usually not extending beyond posterior corner of head; apical 3 segments forming club. Eyes small to medium, well convex, situated anterior to the midlength of sides of head.

Trunk short, stout, with slightly convex node in profile; pronotum with distinct humeral angle; posterolateral portion of pronotum projecting and partly covering forecoxa; promesonotal area depressed without distinct suture; mesoprecoxal ridge well developed, projecting over base of fore coxa; metanotal groove weakly impressed or absent; dorsal portion of propodeum just posterior to metanotal groove bearing small paired processes; propodeal spine more or less distinct, with acute apex; posterior portion of propodeum both sides of petiolar insertion forming lamelliform ridges. Ventral processes absent on meso- and metanotum. Legs robust; middle and hind tibial spurs absent. Petiole cylindrical, truncate anteriorly, without distinct anterior peduncle; subpetiolar process dentiform or absent. Postpetiole with rounded node, broadly attached to gaster. Sting small.

Female: General form of head as in worker, with larger eyes and small ocelli. Trunk short as in worker; pronotum marginate anteriorly, not overhung by mesoscutum; mesonotum more or less flattened dorsally; notauli absent, parapsidal furrows present; mesoscutellum overhanging metanotum; propodeum declining posteriorly; propodeal spines stout. Forewing with type III venation; m-cu absent; radial cell closed. Remainder of body and appendages like those of worker.

Male: Head subglobose, compressed dorsoventrally; occipital carina low. Mandibles reduced to rudimentary small lobes with a few setae. Palp formula 3 : 2. Clypeus convex in the middle, with straight anterior margin. Frontal carinae less developed. Antennal insertions exposed, situated almost in the middle of head length apart from posterior margin of clypeus. Antennae 13-segmented; scape shorter than apical segment of antenna; funiculus rather thick, filiform. Eyes large and prominent. Ocelli well developed.

Pronotum overhung by mesoscutum; mesonotum thick, convex dorsally; notauli distinct, parapsidal furrows present but often weakly impressed on mesoscutum; mesoscutellum overhanging metanotum; mesoprecoxal ridge absent; propodeum with short dorsal surface and dentiform projections posterodorsally. Forewing venation as in female. Middle and hind tibiae each with a single apical spur. Petiole and postpetiole like those of worker. Genitalia not dissected.

The genus *Myrmecina* includes about 20 described species, distributed in the temperate Palearctic, Oriental and Nearctic regions. Most of the species are found in the Indo-Malayan region, but remain unstudied.

Key to the species of *Myrmecina* in Korea, based on workers

1. Bases of antennal scapes simple in structure, without covering lamellae ..... *nipponica* Wheeler
- Basal portion of each antennal scape with a semibulbous lamella covering the articulation condyle ..... flava Terayama

1. *Myrmecina flava* Terayama, 1985 노란방패개미

Myrmecina flava Terayama, 1985, Edaphologia 32: 35; Choi and Park, 1999: 21.

Worker. Total length of workers about 2.5 mm. Body colour yellow to yellowish brown; gaster dark brown; legs yellowish brown. Head as long as wide with convex each sides and few concave occipital border. Head irregularly longitudinally rugulose with punctate interspaces; the spaces between the eyes and the ventral extensions of the longitudinal carinae extending from the occipital region punctuate, not rugulose. Compound eyes small, consist of 10-12 ommatidia. Their greatest diameter of compound eye far shorter than the length of the 10th antennal segment. Anterior border of clypeus slightly concave; without median clypeal denticle. Basal portion of each antennal scape with a semibulbous lamella covering the articulation condyle. Propodeal spines directed backwards. Subpetiolar process more or less distinct, with its apex acute, pointed forwards. Mesosoma irregularly longitudinally rugulose. Gaster smooth and shining, by hairs in each segment.

Specimens examined. [JJ] 1w, Mt. Hanla-san, 8. VI. 2001 (DP Lyu).

Locality. [CB] Mt. Heugseong-san, Mt. Hanla-san.

Distribution. Korea (Central and Is. Jeju-do) and Japan

Remarks. The species is easily distinguished by its yellow body color and the unique structure of its antennal bases.

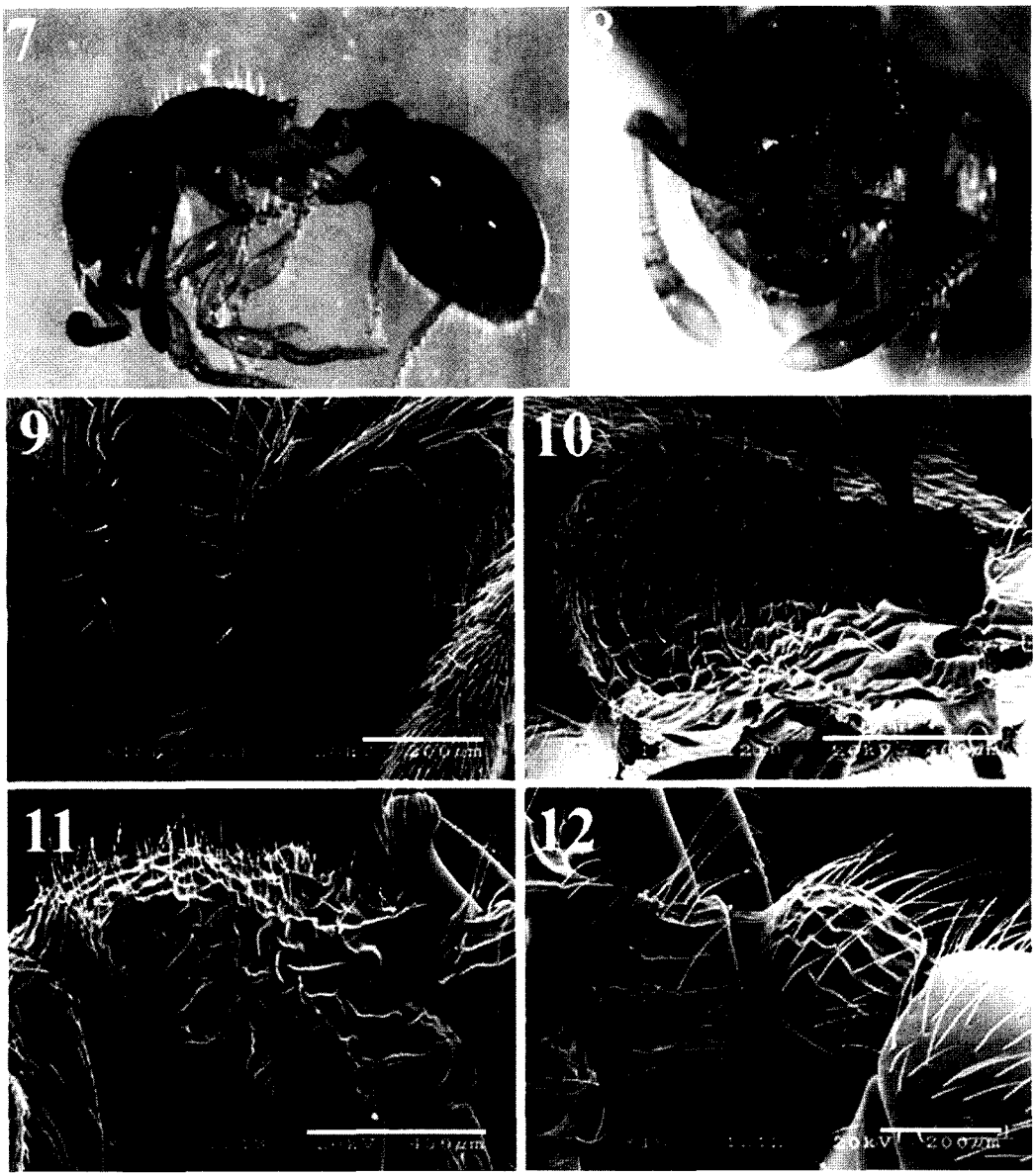
Figs. 1-6. *Myrmecina flava* Terayama.- 1. Lateral view of worker; 2. Head, frontal view; 3. Antennae, base; 4. Alitrunk, dorsal view; 5. Alitrunk, lateral view; 6. Petiolar node, lateral view.

2. *Myrmecina nipponica* Wheeler, 1906 가시방패개미

Myrmecina graminicola nipponica Wheeler, 1906, Bull. Am. Mus. Nat. Hist. 22: 307; Teranishi, 1940: 4; Terayama et al., 1992: 30; Choi et al., 1993: 48; Choi, 1996b: 10; Choi, 1998: 235; Choi, 1999: 508.

Myrmecina graminicola: Collingwood, 1976: 303.

Myrmecina nipponica: Choi, 1985: 411; Choi, 1986: 297; Choi, 1988: 222; Choi and Park, 1991a: 69; Choi and Bang, 1992a: 106; Choi and Bang, 1992b: 37; Choi and Bang, 1992c: 37; Kim et al., 1992: 350; Choi and Bang, 1993: 321; Choi et al., 1993: 350; Kim, 1993: 124; Choi and Lee, 1995: 193; Choi, 1996a: 213;



Figs. 7–12. *Myrmecina nipponica* Wheeler.– 7. Lateral view of worker; 8. Head, frontal view; 9. Antenna, base; 10. Alitrunk, dorsal view; 11. Alitrunk, lateral view; 12. Petiolar node, lateral view.

Choi, 1996c: 47; Kim, 1996: 178; Choi, 1997a: 56; Choi, 1997b: 126; 131; Choi and Park, 1998: 60; Choi and Lee, 1999: 2; Choi and Park, 1999: 25.

Worker. Total length of workers about 3 mm. Body colour black; legs, antennae and mandibles yellow to reddish brown. Head irregularly longitudinally rugulose. The spaces between the compound eyes and the ventral extensions of the longitudinal carinae extending from the occipital portion smooth and shining, almost without sculpture. Compound eyes

rather large, consisting of over 10 ommatidia. The longest diameter of compound eye as long as or longer than the length of the 10th antennal segment. Base of antennal scape simple in structure, without covering lamellae. Anterior margin of clypeus with a small median process which varies in size. Mesosoma irregularly longitudinally rugulose with smooth and shining interspaces. Propodeal spines more or less up-curved posterodorsally. Subpetiolar process obscure. Gaster smooth and shining, by hairs in each segment.

Specimens examined. [GG] 1w, Mt. Dobong-san, 4 VI 2001 (DP Lyu); 1w, Mt. Suri-san, 23 VII 1999 (DP Lyu), [JJ] 9w, Mt. Hanla-san, 8 VI 2001 (DP Lyu); 29w, Mt. Hanla-san, 15 VI 2001 (DP Lyu).

Locality. [GG] Is. Baegryeong-do, Is. Daecheong-do, Is. Ganghwa-do, Mt. Nam-san, Mt. Gwanag-san, Suwon, Mt. Chiljang-san. [GW] Mt. Chiag-san. [CB] Mt. Sobaeg-san, Mt. Kayeop-san, Mt. Duta-san, Mt. Heukseong-san, Mt. Sokri-san. [CN] Mt. Kyeryong-san. [JB] Mt. Deogyu-san, Is. Eocheong-do, Is. Mt. Daedun-san, Seonyu-do, Is. Wi-do, Mt. Naejang-san. [JN] Is. Soheugsan-do, Is. Yeon-do, Is. Jin-do, Is. Jaeun-do, Is. Wan-do, Is. Daeheugsan-do, Is. Bogil-do. [GB] Is. Dog-do. [JJ] Mt. Hanla-san.

Distribution. Korea (Central, South and Is. Jeju-do), Japan and China.

Remarks. It is easily distinguished by the shape of the anterior margin of its clypeus, the form of the propodeal spines, and the sculpturation of the mesosomal dorsum.

Acknowledgements We would like to thank Mr. J.S. Lee and Dr. J.Y. Choi (National Institute of Agricultural Science and Technology) for their technical help on SEM photographing and Dr. B.M. Choi for allowing access to the materials.

REFERENCES

Bolton, B. 1995. *A New General Catalogue of the Ants of the World*, 504 pp. Harvard University Press, Cambridge, Mass.

Choi, B.M. 1996a. Studies on the distribution of ants (Formicidae) in Korea (15). Ant fauna Islands Ullngdo and Dokdo. Cheongju Tea. Coll. 33: 201-219.

Choi, B.M. 1996b. Distribution of ants (Formicidae) in Korea (16). Ant fauna from Cheonlabukdo. Korean J. Soil Zool. 1(1): 5-23.

Choi, B.M. 1996c. Distribution of ants (Formicidae) in Korea (17). Distribution map of provinces. Sci. Edu. Cheongju Nat'l. Univ. Edu. 17: 41-89.

Choi, B.M. 1997a. A guide for the identification of Korean ants (I). Sci. Edu. Cheongju Nat'l. Univ. Edu. 18: 51-77.

Choi, B.M. 1997b. Distribution of ants (Formicidae) in Korea (18). Ants fauna in Island Paekryeongdo and Taecheongdo. Cheongju Tea. Coll. 34: 119-138.

Choi, B.M. 1999. Studied on the distribution of ants (Formicidae) in Korea (22). Ant fauna Chiljangsan. Cheongju Tea. Coll. 36: 496-529.

Choi, B.M. and J.R. Bang. 1992a. Studies on the distribution of ants (Formictdae) in Korea (9). Ant fauna in Mt. Tokyu. Korean J. Appl. Entomol. 31(2): 101-112.

Choi, B.M. and J.R. Bang. 1992b. Studies on the distribution of ants (Formicidae) in Korea (11). Ant distribution in Kyeongsangbukdo. Sci. Edu. Cheogju Nat'l. Univ. Edu. 14: 1-49.

Choi, B.M. and E.C. Park. 1999. Studied on the distribution of ants (Formicidae) in Korea (23). Ant fauna Mt. Heuksong. Sci. Edu. Cheogju Nat'l. Univ. Edu. 20: 21-26.

Curtis, J. 1829. *Myrmecina latreillii*. Plate 265 [plus 2 unnumbered pages of text] in: Curtis, J. British Entomology; being illustrations and descriptions of the genera of insects found in Great Britain and Ireland 6: 242-288 London.

Forel, A. 1907. Formiciden aus dem Naturhistorischen Museum in Hamburg. II. Teil. Neueingange seit 1900.

Mitt. Naturhist, Mus. Hamb. 24: 1-20.
Kim, B.J. 1996. Synonymic list and distribution of Formicidae (Hymenoptera) in Korea. Entomol. Res. Bull. Suppl. (KEI): 169-196.
Mann, W.M. 1921 The ants of the Fiji Islands. Bull. Mus. Comp. Zool. 64: 401-499.
Teranishi, C. 1940. *Works of Cho Teranishi. Memorial Volume*. Osaka: Kansai Entomol. Soc., 312 + (posthumous section) 95 pp.
Terayama, M., B.M. Choi, and C.H. Kim. 1992. A check list of ants from Korea with taxonomic notes. Bull. Toho Gakuen 7: 19-54.
Wheeler W.M. 1928. Ants collected by Professor F. Silvestri in Japan and Korea. Bull. Lab. Zool. Gen. Aagrar. R. Sc. Super. Agric. 22: 96-125.
Wheeler, W.M. 1906. The ants of Japan. Bull. Am. Mus. Nat. Hist. 22: 301-328.
Wheeler, W.M. 1917. The North American ants described by Asa Fitch. Psyche 24: 26-29.

(Received: March 10, 2003, Accepted: May 30, 2003)